FORM PTO-1390 (Modified) (REV 10-95) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: 1583

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR): 09/806736

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE 99/03547	OCTOBER 30, 1999	DECEMBER 10, 1998

TITLE OF INVENTION

MEASURING PROBE AND METHOD FOR MEASURING THE CONCENTRAION OF AGENTS IN GASES AND/OR LIQUIDS

APPLICANT(S) FOR DO/EO/US

Gerlinde BISCHOFF, Robert BISCHOFF

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
    A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☐ Other items or information:

EF 215 953 193 US

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR) 09/806736	INTERNATIONAL APPLICATION NO. PCT/DE 99/03547	ATTORNEY'S DOCKET NUMBER 1583

20. The following fees are submitted:.	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :	
☐ Search Report has been prepared by the EPO or JPO **$930.00**	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) **$720.00**	
☐ No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) **$790.00**	
☒ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO **$1,070.00**	
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) **$98.00**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	**$1,000.00**
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	8 - 20 =	0	x $18.00	**$0.00**
Independent claims	1 - 3 =	0	x $80.00	**$0.00**
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**
TOTAL OF ABOVE CALCULATIONS =				**$1,000.00**
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable).**			☒	**$500.00**
SUBTOTAL =				**$500.00**
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +				**$0.00**
TOTAL NATIONAL FEE =				**$500.00**
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**			☐	**$0.00**
TOTAL FEES ENCLOSED =				**$500.00**
			Amount to be: refunded	$
			charged	$

☐ A check in the amount of to cover the above fees is enclosed.

☒ Please charge my Deposit Account No. **19-4675** in the amount of **$500.00** to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **19-4675** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

STRIKER, STRIKER & STENBY
103 EAST NECK ROAD
HUNTINGTON, NEW YORK 11743

SIGNATURE

MICHAEL J. STRIKER
NAME

27233
REGISTRATION NUMBER

APRIL 4, 2001
DATE

09/806736
JC02 Rec'd PCT/PTO 04 APR 2001

UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Group: Attorney Docket # 1583

Applicant(s) : BISCHOFF, G., ET AL

Serial No. :

Filed : Simultaneously

For : MEASURING PROBE AND METHOD FOR MEASURING THE CONCENTRATION OF AGENTS GASES AND/OR LIQUIDS

SIMULTANEOUS AMENDMENT

April 4, 2001

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

S I R S:

Simultaneously with filing of the above identified application please amend the same as follows:

In the Claims:

Cancel all claims without prejudice.

Substitute the claims attached hereto.

REMARKS:

This Amendment is submitted simultaneously with filing of the above identified application.

With the present Amendment applicant has amended the claims so as to eliminate their multiple dependency.

Consideration and allowance of the present application is most respectfully requested.

Respectfully submitted,

Michael J. Striker
Attorney for Applicant(s)
Reg. No. 27233

Patent Claims

1. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids so characterized that a covering film (7) from a liquid is located above the sensor-active layer of the measuring probe (1).

2. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 so characterized that the covering film (7) consists of water.

3. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 so characterized that the covering film (7) consists of the liquid to be analyzed.

4. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 so characterized that several measuring probes (1) are combined in an array with various structural dimensions and the individual structures show differing substances (4).

5. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 so characterized that measuring probes (1) are combined with other measuring probes for the determination of the differing physical parameters.

6. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 so characterized that the measuring probe (1) is directly implemented into the control circuit of a semiconductor component.

7. A measurement procedure for the detection of agents and their concentration in gases and/or liquids by means of a measuring probe (1) according to claim 1 so characterized that a covering film (7) consisting of a liquid, which film is located above the substance (4) of the sensor-active layer, can be included in the active zone of the measuring probe (1) and that the combination of various partial conductances, in particular, for the substance (4), the covering film (7) and the active surface (8) formed between both of these can be included in the determination of the total conductance without compensation.

8. Measurement procedure for the detection of agents and their concentrations in gases and/or liquids using a measuring probe (1) according to claim 7 so characterized that measured values can be transmitted over EDP networks or/and telecommunications facilities to authorized recipients.

TWO PAGES OF DRAWINGS ON THIS

Patent Claims

1. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids so characterized that a covering film (7) from a liquid is located above the sensor-active layer of the measuring probe (1).

2. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 so characterized that the covering film (7) consists of water.

3. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 [and 2] so characterized that the covering film (7) consists of the liquid to be analyzed.

4. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim[s] 1 [to 3] so characterized that several measuring probes (1) are combined in an array with various structural dimensions and the individual structures show differing substances (4).

5. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim[s] 1 [to 4] so characterized that measuring probes (1) are combined with other measuring probes for the determination of the differing physical parameters.

6. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim[s] 1 [to 5] so characterized that the measuring probe (1) is directly implemented into the control circuit of a semiconductor component.

7. A measurement procedure for the detection of agents and their concentration in gases and/or liquids by means of a measuring probe (1) according to claim[s] 1 [to 6] so characterized that a covering film (7) consisting of a liquid, which film is located above the substance (4) of the sensor-active layer, can be included in the active zone of the measuring probe (1) and that the combination of various partial conductances, in particular, for the substance (4), the covering film (7) and the active surface (8) formed between both of these can be included in the determination of the total conductance without compensation.

8. Measurement procedure for the detection of agents and their concentrations in gases and/or liquids using a measuring probe (1) according to claim 7 so characterized that measured values can be transmitted over EDP networks or/and telecommunications facilities to authorized recipients.

TWO PAGES OF DRAWINGS ON THIS

Measuring probe and procedure for the measurement of the concentration of agents in gases and / or liquids.

The invention designates a measuring probe of a measuring device and an associated measurement procedure for the measurement of the concentration of agents in gases and/or liquids. To do this, the measuring device uses the change in electrical characteristics. To conduct the measurement, the substances to be examined are placed in contact with the surface of the measuring device. The substance changes the conductivity, depending on its concentration, of the surface of the measuring device.

It is known, that the concentration of various agents can be determined with the aid of resistance measurements. For example, the international patent classification (IPC), G01N 27/00,describes the analysis of materials through the application of electrical methods. Under G01N 27/12 special resistance studies are considered, which show the change in the resistance of a solid in relation to the absorption of a liquid. Measuring probes with electrodes are used to do this, which are described in G01N 27/07.

It is also known that such measuring probes of measuring devices consist of two suitably formed electrodes, which are attached to a support, and that the conductivity of a suitable substance is determined between these electrodes as an indirect measurement variable for the determination of the concentration of the substances being examined. Depending on the agents being examined, various often specially optimized substances are used, on which the agents being examined adsorb. In addition, the substance itself also has a certain electrical conductivity, which is changed by the adsorption and physical combination of agents serving as an adsorbate. Organic and inorganic semi-

conductor materials are used as suitable materials for this purpose, since the relative change of the conductivity due to the adsorption of these agents is sufficiently large. For various agents, both small band and broadband substances are known, which function selectively. The change of the electrical conductivity serves to determine the concentration since a monotone relation of this with the concentration exists in the applied measurement area. It is possible to use an oscillating field for the measurement of the change in the electrical conductivity and to apply its additional parameters such as specific complex loss angle as an additional aid for the evaluation.

By using a suitable design of the electrodes, the usable conductivity range can be represented by a suitable conductance of the measuring probe. By means of a suitable arrangement of the surface, such as pores, between the electrodes, the proportional influence of the adsorption on the part of the substance used for the measurement can be changed. The adsorption time is determined, in particular, by the type of substance layer and the substance temperature.

A number of such measuring probes for the determination of the concentration of various agents in gases are manufactured with organic semiconductor material, preferably polymers, on ceramic supporting materials. Due to the high humidity and the high surface tension of water, the substances of such measuring probes are coated with a thin water film in a normal climate. Due to its own conductivity, this results in a total conductivity of the measuring device, which is about one magnitude above that of the substances used. In order to prevent an incorrect measurement due to the absorption of water, such measuring probes are equipped with a heating element or a separate heating unit,

which heats the substance so that the moisture film evaporates completely. These measuring probes necessarily function with higher temperatures compared to the surroundings and primarily above 150°C. The useful measurement range, with respect to the concentration of the agents, normally runs from a minimum of 1 part per million (ppm) to a saturation concentration of the agent being determined. Within this measurement range and with increasing concentration, there is a monotone increasing conductance of the measuring probe, which, based on previous calibration, can be converted into the concentration of the agent being examined.

The disadvantage of such sensors is the relatively low sensitivity to very low concentrations for certain agents in gases and the requirement for heating. Due to this, such measuring probes are more complex and more expensive to manufacture and to operate. In addition, the use of these in the ambient temperature range, for example for a normal climate, is limited.

The specification sheet, EP 0 328 108 A3, describes an electrochemical sensor for the measurement of the concentration of a chemical substance in a solution, where two field-effect transistors (FET) and a reference electrode are arranged on a substrate. A hydrogel as an "electrode" is arranged above the area of the channel of one of the FETs and the reference electrode and enzymes are used for substance detection, which activate the FET through the change of the conductivity in the electrode. The detection of the type and concentration of the substance in the solution is done by means of an evaluation of the signal from the FET.

This sensor can only be used for the determination of relatively high concentrations in the range of a few parts per

million for substances in solutions but agents in gases cannot not be determined sufficiently with this method. The concentration of only a few selected substances can be determined in this manner. In addition, the hydrogel for the sensor can be easily and irreversibly contaminated with substances disturbing the measurement and this makes the sensor unusable. Due to the microstructures, expensive technologies from the microelectronics area are needed to manufacture such sensors.

The announcement of the PCT application with the number, WO 89/08713, reveals a method and a device for determining the concentration of certain body fluids. A fluid sample is placed in a sample cell with two electrodes and mixed with an oxidizing agent and a buffer as a redox-system and then the conductivity is read from an ammeter and an evaluation unit and display unit show the concentration of the substance in the body fluid. The conductivity of the sample fluid is also used to turn on the measuring device. The disadvantage of this method is the limitation to liquids, the relative insensitivity with a lower detection range in a concentration of ppm and the arrangement of a reference electrode in the sample cell. This is further development of the measurement arrangement for the determination of the conductivity of liquids.

The purpose of the invention is to develop a measuring probe and an associated measuring process, which results in a sensitive measuring probe, without the above disadvantages, for the detection of agents and their concentration in gases and/or liquids and this is to be done under the most varied of real measuring conditions without additional expenditure and without a heating element.

This purpose is fulfilled by the characteristics listed in patent claim 1 and in patent claim 7. Priority for further developments result from the subclaims.

The essence of the invention is that a measuring probe in the form of a dipole is used to determine the electrical resistance of a sensor-active layer, where a covering film from a liquid such as water is purposely included in the active zone of the measuring probe. The covering film forms over the substance of the sensor-active layer. Based on the covering film, a combination of various partial conductances is available. In particular these are the conductances for the substance, the covering film and for the active surface, which forms between both of these. Molecules of the covering film can also serve as an adsorbate for the agent to be determined in the gas or liquid, in addition to the substance. The adsorption characteristics for certain agents can be optimized by the systematic selection of the liquid for the covering film.

The measurement procedure, according to the invention, is specially designed for the measuring probe according to the invention. The probe operates basically under saturated conditions with respect to the adsorption of the liquid in the diffusion layer. In its basic condition (0% agent + liquid in saturation) there is a comparatively high conductance. The presence of certain agents, depending on the type, results in a hindrance or promotion of mobile charge carries and/or reduces or increases the number of the mobile charge carriers. In this manner, the smallest traces of the gas to be detected have an exponential effect on the electrical conductivity of the measuring probe and reduce or increase the conductivity drastically and the effect of a reversible doping occurs on the surface of the measuring probe. This effect occurs even with relatively small con-

centrations of the agent to be found and is reinforced with increasing concentration of the agent. With an increasing concentration of the agent, this results in a decreasing or increasing differential conductance of the measuring probe with respect to the basic condition. This conductance can, according to the invention and assuming prior calibration, be used for the calculation of the concentration of the agent to be found. To do this an equivalent circuit diagram for the sensor is used, which represents this an electrical dipole. The complex equivalent variables required for the description in the measurement window correlate primarily with the resistances and the thicknesses of the individual layers.

The advantages of the invention are found particularly in the greater sensitivity of the measurement procedure, compared to measuring probes without a covering film over the substance, by at least two powers of ten and thus the detection limit, for the agent to be found, is in the area of parts per trillion (ppt) of concentration of the agent. Thus, the possibility of conducting measurements under real conditions without additional expenditure exists, for example at room temperature in a normal atmosphere or inside the body of a living organism. Long-term measurements for the continual monitoring of concentrations of certain agents can be carried out without the use of complicated equipment.

The sensor does not require any heating element and thus no temperature equalization or other special measuring conditions.

It is also imaginable that such measuring probes could be combined with other measuring probes in order to, for example through the determination of the temperature and/or hu-

midity, be able to consider the influence of these parameters for the calculations in the process according to the invention.

In addition, it is also imaginable that several such measuring probes could be combined, for example, in an array with various structural dimensions and/or substances in order to include the selective characteristics of the substances in the analysis with respect to certain agents.

Another further development could be that such sensors on supporting material could be integrated directly into the circuit of a controlled semiconductor element such as the base or gate circuit.

Additional possibilities for using the measurement results for concentrations of certain agents occur when these results are transferred to authorized recipients over EDP networks or telecommunications systems.

The invention will be described in more detail as an example of application based on figure 1 as the construction principle of the measuring probe and figure 2 as the equivalent circuit diagram of the measuring probe.

According to figure 1, a measuring probe (1) for agents in gases consists of a pair of electrodes (2), which are partially attached to a supporting material (3), whereby these can be formed as a rise on the surface. There is a suitable solid substance (4)in layers located above this surface structure. In particular this substance is an organic semiconductor in the form of a polymer, which reacts to the adsorption of certain agents (5) with a sufficient change in conductivity. The agents (5) to be analyzed are in a gaseous state (6), which expands as an environment for the

measuring probe around the surface of the measuring probe (1). There is also a covering film (7) located between the surface structure of the measuring probe (1) and the gaseous state (6). The film consists of water and the films forms due to the finite humidity of the gaseous state (6). Due to the mutual influence between the substance (4) and the covering film (7) of water, an effective active surface (8) is formed with respect to the change of the conductivity. Molecules of the agent (5) to be found are adsorbed on the surface of the substance (4) and on the molecules of the covering film (7) and at these locations they replace water molecules and change the total conductivity of the sensor.

According to figure 2, an equivalent circuit diagram can be assumed for the individual layers and thicknesses of the measuring probe in the form of a resistance network, which represents the measuring probe as an electrical dipole in a permissible measurement window. Such an equivalent circuit diagram is used primarily as the basis for the calibration of the measuring probe (1) and, based on this, the determination of the concentration of the agents (5) to be analyzed. In particular, this allows a non-linear representation by fiducial values, which are essentially independent of one another and correlate strongly with the design of the measuring probe. By using complex equivalent variables in the form of resistances, the behavior in the electrically oscillating field is also described. A parallel connection between an effective resistance and a reactive impedance characterizes the layer resistances for the supporting material (3), the substance (4), the active surface (8), the covering film (7) of water, the gaseous state (6) and an equivalent resistance I 9, which is essentially dependent on the thickness of the electrodes (2) and the substance (4); an equivalent resistance II 10, which is essen-

tially dependent on the thickness of the active surface (8) and an equivalent resistance III 11, which is essentially dependent on the characteristics of the covering film (7). The thickness of the covering film (7) out of, for example, water is essentially dependent on the temperature. The individual layer resistances are connected in parallel and the equivalent resistances (9, 10, 11) are arranged on both sides between the layer resistances of substance (4), the active surface (8), of the covering film (7) and the gaseous state (6).

Using conventional measurement and evaluation units, the change of the total conductivity of the sensor is registered through lines from the electrodes (2) and the change is recorded and evaluated to determine the concentration of the agent.

Reference Symbols Used

1. Measuring probe
2. Electrodes
3. Supporting material
4. Substance
5. Agent
6. Gaseous state
7. Covering film
8. Active surface
9. Equivalent resistance I
10. Equivalent resistance II
11. Equivalent resistance III

Patent Claims

1. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids so characterized that a covering film (7) from a liquid is located above the sensor-active layer of the measuring probe (1).

2. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 so characterized that the covering film (7) consists of water.

3. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claim 1 and 2 so characterized that the covering film (7) consists of the liquid to be analyzed.

4. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claims 1 to 3 so characterized that several measuring probes (1) are combined in an array with various structural dimensions and the individual structures show differing substances (4).

5. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claims 1 to 4 so characterized that measuring probes (1) are combined with other measuring probes for the determination of the differing physical parameters.

6. A measuring probe (1) with a sensor-active layer in the form of an electrical dipole for the detection of agents and their concentration in gases and/or liquids according to claims 1 to 5 so characterized that the measuring probe (1) is directly implemented into the control circuit of a semiconductor component.

7. A measurement procedure for the detection of agents and their concentration in gases and/or liquids by means of a measuring probe (1) according to claims 1 to 6 so characterized that a covering film (7) consisting of a liquid, which film is located above the substance (4) of the sensor-active layer, can be included in the active zone of the measuring probe (1) and that the combination of various partial conductances, in particular, for the substance (4), the covering film (7) and the active surface (8) formed between both of these can be included in the determination of the total conductance without compensation.

8. Measurement procedure for the detection of agents and their concentrations in gases and/or liquids using a measuring probe (1) according to claim 7 so characterized that measured values can be transmitted over EDP networks or/and telecommunications facilities to authorized recipients.

TWO PAGES OF DRAWINGS ON THIS

Summary

The invention describes a sensitive measuring probe (1) and an associated measuring procedure for the detection of agents and their concentration in gases and/or liquids and this measuring probe (1) can be used under the most varied real measuring conditions without additional expenditure and does not require a heating element.

According to the invention, this requirement is fulfilled in that a covering film (7) consisting of a liquid is located above the sensor-active layer of a measuring probe (1) and the covering film (7) is included in the active zone of the measuring probe (1) and the combination of various partial conductances, in particular, of the substance (4), the covering film (7) and the active surface (8) formed between both of these is included in the determination of the total conductance without compensation.

See figure 1.

Fig. 1

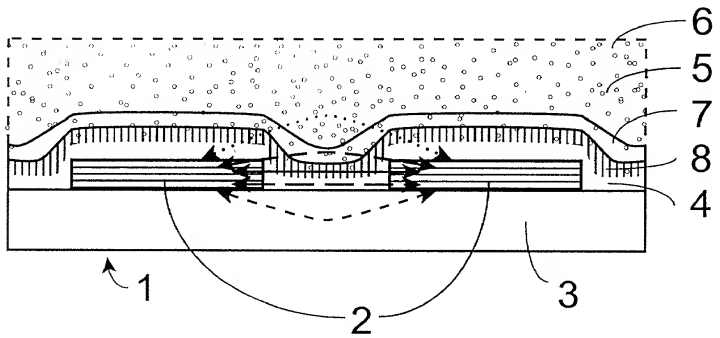
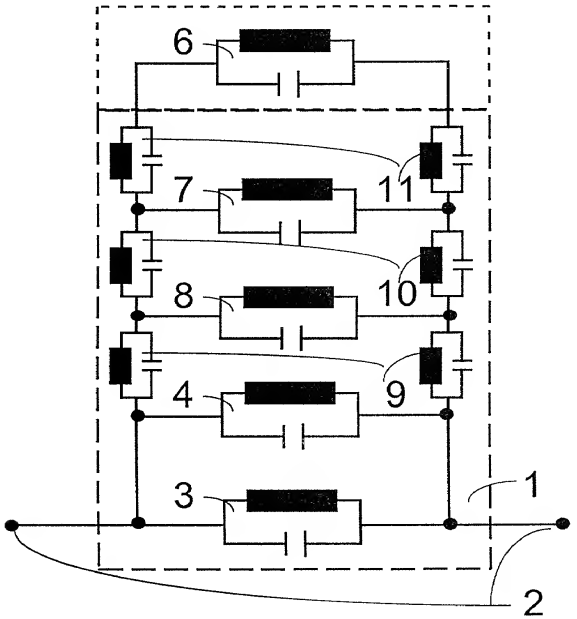


Fig. 2



DECLARATION AND POWER OF ATTORNEY FOR NATIONAL STAGE OF PCT PATENT APPLICATION

As a below-named inventor, I hereby declare that:

1. Bischoff, Gerlinde 2. Bischoff, Robert

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **Measuring probe and method for measuring the concentration of agents in gases and/or liquids** the specification of which was filed as PCT International Application number **PCT/DE99/03547 on October 30, 1999**

I hereby state that I believe the named inventor or inventors in this Declaration to be the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365 (b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s):			Priority claimed:	
198 56 885.1	Germany	December 10, 1998	X	
(Number)	(Country)	(Date filed)	Yes	No
(Number)	(Country)	(Date filed)	Yes	No

As a named inventor, I hereby appoint the following attorney to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Michael J. Striker, Reg. No. 27233

Direct all telephone calls to Striker, Striker & Stenby at telephone no.: (631) 549 4700 and address and all correspondence to:

STRIKER, STRIKER & STENBY
103 East Neck Road
Huntington, New York 11743
U.S.A.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statement may jeopardize the validity of the application or any patent issued thereon.

Signature: G. Bischoff	Date: 22.02.2001	Residence and Full Postal Address:
Full Name of First or Sole Inventor: Gerlinde Bischoff	Citizenship: GERMANY	Carl-von-Ossietzky-Straße 12 D-06114 Halle / Saale Germany DEX
Signature: R. Bischoff	Date: 22.02.2001	Residence and Full Postal Address:
Full Name of Second Inventor: Robert Bischoff	Citizenship: GERMANY	Carl-von-Ossietzky-Straße 12 D-06114 Halle / Saale Germany DEX
Signature:	Date:	Residence and Full Postal Address:
Full Name of Third Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fourth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fifth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Sixth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Seventh Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Eighth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Ninth Inventor:	Citizenship:	

DECLARATION

I, Gene Rollins
of Freiburg

do solemnly and sincerely state as follows:

THAT I am well acquainted with both the German and English languages and am capable of correctly translating technical and other matter written in said language into English.

THAT the document attached hereto is a true and correct translation of PCT/DE99/03547, WO 00/34764 A1.

AND I MAKE this statement believing it to be true in every particular.

STATED at Freiburg

this 7th day of March 2001

Signed: Gene Rollins